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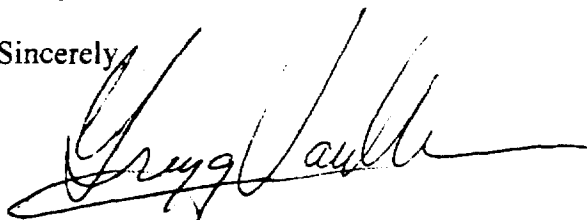
November 26, 1996

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Attached are my responses to the comments submitted in response to FCC NOI 96-198,
Access to Telecommunications Services, Telecommunications Equipment, and Customer
Premises Equipment by Persons with Disabilities.

A copy of these comments is also included as an ASCII text file on the enclosed disk.

Sincerely,



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Director, Trace R&D Center

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In the Matter of)
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Implementation of Section 255 of the)
Telecommunications Act of 1996)
)
Access to Telecommunications Services,)
Telecommunications Equipment, and)
Customer Premises Equipment)
By Persons with Disabilities)

WT Docket No. 96-198

REPLY COMMENTS OF
GREGG C. VANDERHEIDEN, PH.D.
DIRECTOR, TRACE R&D CENTER

I hereby submit these reply comments to the Federal Communication Commission's
(FCC's or Commission's) Notice of Inquiry (NOI) in the above-captioned proceeding.

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As a researcher who has worked extensively with industry on building disability access features directly into standard products, I am very sympathetic to many of the issues raised by industry.

Need for Flexibility

I concur with the comments (Bell Atlantic, Ericsson and Microsoft, as well as most of the other companies commenting) that emphasize that the guidelines (particularly the design guidelines) need to allow great flexibility on the part of industry in meeting access goals. The tremendous variety of products and devices that will be used to carry out telecommunications means that very few detailed specifications will be applicable across all devices. One place where detailed specifications will be helpful would be in the area of interconnections. Having standardized connections formats greatly simplifies the ability of both telecommunication and accessibility device manufacturers to create intercompatible products. Even here, however, no single standard should be mandated for all products, since different connections may be the most appropriate for different types or sizes of devices.

Freedom to Innovate

It is also important that the manufacturers are able to maintain their ability to innovate. This was a concern expressed by most of the manufacturers who submitted comments. A prime concern of many was that new products not be prevented from being released due to the inability to apply suitable accessibility provisions to the product.

This concern, however, seems to be well-addressed in the design of the law, which states simply that access provisions need to be applied only if readily achievable. If techniques are known and readily achievable, they could be incorporated without delaying or preventing release. If no techniques were known (and none could be reasonably developed) providing access to a new technology for people with one, more, or all types of disabilities, releasing a product that was not accessible to people with one, more or all types of disabilities would not put the company out of compliance with the law or any regulations being discussed.

Voluntary Cooperation Between Industry and Consumers

I would also like to applaud the suggestions and emphasize the necessity for voluntary efforts between industry, consumer and research groups on the development of techniques, strategies, and standards in this area [AT&T, Lucent, Microsoft, NYNEX, Omnipoint, Pacific Bell, PCIA]. There is much detail that will need to be worked out which goes beyond the scope of what can be effectively put into guidelines or regulations. Reliance on such voluntary action, however, should focus on implementation details rather than the underlying motivation. History has shown us how effective voluntary cooperative efforts can be in developing implementation strategies for activities which are mandated. History also shows us how ineffective it is to rely on volunteerism in the absence of any mandate for action. It isn't that industries are not interested in this area; it is simply that in highly competitive markets, accessibility issues (and often even usability

issues in general) do not make it high enough up the importance chart to get off the "should do" list and onto the "must do" list.

Mandates, Competition, and Profit Margins

In fact, a surprising number of companies in confidential discussions over the years have suggested that the best strategy for advocates of accessible design would be to legislate that products must be made accessible. They suggested that mandating accessibility would:

- a) Result in companies who have accessibility issues on the "should do" list moving them up to the "must do."
- b) Level the playing field. (Several companies said that they were interested in doing more accessible designs, but were afraid to slow down or add features that their competition did not have to add, since they did not want to risk falling behind.)
- c) Reward companies who actively seek accessibility.

Several companies (Lucent, Microsoft, Motorola, Sprint) mentioned in their comments that profit margins were thin, and that they were concerned that any cost, no matter how slight, would eat into thin profit margins. Once again, if everyone needs to address accessibility issues (rather than just those who volunteer), then everyone would have the same cost issues, and a nominal increase in costs would be felt by everyone and result in a nominal increase in prices. Substantial increases in costs which might affect a user's decision whether to buy a product at all would likely not come into play, since this would fall into the category of not being readily achievable.

Honeymoon Period

At least one company (Microsoft) suggested that there should be a honeymoon period for newly introduced technologies: that is, a period of one year after the introduction of a product when accessibility was not required. After the product was established, the accessibility issues could be addressed. There are fundamental problems with this approach. First, the entire philosophy of the Telecommunications Act was that disability access should be built in from the very beginning as an integral part of the design of the product. Beginning to add it a year later negates any possibility of either design integrity or cost savings that would be inherent in building something in from the start versus re-engineering the product. If it is readily achievable to include access from the beginning, it is not clear why it shouldn't be done. If including access from the beginning is not readily achievable, it would not appear that any exemption would be needed, since it would not be required under the Act.

All Products Accessible to All

Another topic of concern to a number of industry members commenting was a requirement that all products be made accessible to all individuals simultaneously. Part of this concern stems from the fact that the Act states rather explicitly that products (not

product lines) should be made available to people with disabilities (as defined by the ADA) whenever it is readily achievable. The key phrase here again appears to be "where readily achievable." If it is readily achievable to make each product accessible across disabilities, it should be done. If it is only practical to make a particular product accessible for some disabilities and not others, the Act and subsequent guidelines/regulations should (and do) only require that access be provided for those disabilities where it is readily achievable). If it is not readily achievable to make things simultaneously accessible to two groups, then it should not be (and is not) required, and companies should be (and are) free to deal with the situation in a fashion which is readily achievable. It is a fact that not all products can be made accessible to all people. It is also a fact that it is possible to make many products accessible across a broad range of disabilities and at very low cost. The key to this issue would seem to lie in

1. ensuring that there is a rich collection of information and examples which can be used to demonstrate effective and commercially practical cross-disability access to as wide a variety of products as possible, and
2. focusing on the readily achievable aspect of the Act to separate those things which are reasonable to ask of industry from those that are not. Categorical elimination of cross-disability access because there are examples of places where it is not readily achievable does not seem necessary, as long as the "readily achievable" test is in place.

It should be remembered that a large and important user population is individuals who are older. With this population, we find individuals living together who would, between them, exhibit a myriad of disabilities. We also find large numbers of individuals who individually experience multiple disabilities or functional limitations. According to the 1991-92 census data, 49.52% of individuals over the age of 65; 68% of those over the age of 75, and 84% of those over the age of 85 have functional limitations. The same data show that 70% of those over the age of 65 who have a functional limitation have two or more functional limitations. Clearly, these individuals can't buy two or more different phones, each built to address different disabilities, to collectively secure the features they need.

Even for individuals with just a single disability, access across product lines or even to any product which a particular store happens to carry is dependent upon all of the products being accessible, not just some of them (again, where readily achievable). For most consumers, their knowledge of products that are available stops at the products which are on the store shelf, or which are carried by a particular company, even though it may be a small fraction of the overall line offered by a manufacturer.

Definition of Disability

The Act calls for the definition of disability to be that used in the ADA. Some manufacturers (Microsoft and Motorola) have suggested that some parts of the ADA definition are oriented more toward handling discrimination cases involving individuals than groups of individuals. (They suggest that only the first item in the definition be used

in applying this Act – those "who have a physical or mental impairment substantially limiting one or more of the major life activities.") Since the objective is to create products which would be accessible to all people in this category, it would appear that making a product which usable by all of the individuals in the first category of the ADA's definition would automatically result in a product which was accessible by individuals in the latter two categories of the definition. Thus, limiting the definition to just Clause A of the ADA definition would appear to be sufficient, as the companies suggest. On the other hand, it does not appear that limiting the definition to Clause A would in any material way reduce the requirements on the part of industries to design accessible products. It would seem to limit the individuals who might be eligible to complain.

Definition of Manufacturer

A number of industries offered comment recommending that the definition of manufacturer be restricted to either hardware manufacturers (Microsoft, Southwestern Bell) or to those who assemble the final product (Ericsson, Lucent, Microsoft, Omnipoint). One does not have to look very far in the current trends to determine two things:

1. The bulk of most telecommunication products, and 90% or more of the human interface on these products, will be determined by the software rather than the hardware of the product.
2. It is becoming increasingly difficult to determine who the "manufacturer" of a product is.

Hardware and software components are bundled together into a system. Often, these components were gathered from subcomponents. The final package may be bundled with services and yet more components, and then offered to a user. In many cases, the various components are actually put together at the storefront, while at other times by mail order companies. When emission standards are involved (which are almost entirely definable by hardware or hardware specifications), it is fairly easy to identify who is responsible for leakage. For user interface issues, however, the accessibility of a product can be either established or completely undermined in the bundling process. It is also often impossible to create an accessible product if the components themselves are not accessible.

For example, consider a hand-held device that is used for making telephone calls as well as enhanced telecommunication functions. The accessibility of this product for people who are deaf is a function of the compatibility of the device with other TTY/TT systems. The person who sells the hardware/software telecommunication package will only find it readily achievable to address access for this disability group if the hardware device is capable of supporting the TTY signals and the software telecommunication packages are designed to support these features. (In this case, these two components are produced by different companies, one focusing on hardware and the other on software systems.) The manufacturer creating the hardware subsystem, however, is not able to create a system which is compatible with the TTY signals unless the modem subcomponents are designed to physically support these signals.

- If only the final assembler is required to address accessibility (if readily achievable), then it will never be readily achievable for them to offer an accessible product, since they do not have the capability of generating either the software or the hardware.
- If only the hardware manufacturer is required to make it accessible (if readily achievable), they also would not have to offer accessible materials, since without the accessible sub-assemblies it is not readily achievable for them. In addition, without the software package, which they may not manufacture, their product would be neither accessible nor inaccessible (or even necessarily functional) as they manufactured it.
- If, however, the guidelines/regulations applied to:

"anyone who develops products or subcomponents which are marketed for use in telecommunications,"

the telecommunication sub-assembly manufacturer would be required to incorporate accessibility features (where readily achievable) in their subcomponent, the hardware manufacturer would be required to use accessible subcomponents (where readily achievable), the software manufacturer would be required to write their software to support such features where they existed in the hardware (where readily achievable), and the final system integrator (and any additional people that the hardware and software passed through before being sold to the customer) would be both able to and required to provide accessible products (where readily achievable).

A fear was expressed that this technique would result in individuals who produced products (such as resistors, capacitors, etc.) which went into telecommunication products but which were not integral to the products also being inadvertently covered, even though the manufacturers had no idea that this was the end point for their product. Language such as that proposed above, ***"anyone who develops products or subcomponents which are marketed for use in telecommunications,"*** would eliminate that problem by limiting the scope to those individuals creating products or subassemblies specifically designed or destined for telecommunication purposes or which include telecommunication as one of their purposes. Even in this case, accessibility would be limited to those aspects of the device which are used in telecommunication or enhanced telecommunication activities, and not other activities which might be carried out on the same piece of hardware but which are not telecommunication in nature.

Microsoft cited a concern about people with disabilities suffering when distributing responsibility would result in no one being responsible. If the language was worded so that responsibility only lay with one of the players, without specifying which, this scenario would apply. However, if the language is focused so that it applied to any individual in the chain who passed up an opportunity to make their subsystems or systems accessible when it was readily achievable, this situation would seem to be avoided. In all cases, of course, the guidelines or regulations would only apply where accessibility was readily achievable.

Congress was wise to vest oversight of accessibility requirements on all CPE, carrier, and service providers in one agency, since one will not be able to tell who is serving in which role and when.

Definition of CPE and Inclusion of Software

Probably one of the most interesting and important issues to arise out of the NOI and the comments was the definition of CPE and whether software is included as a part of CPE. If CPE is not defined carefully, it is possible that products which provide exactly the same function but which were sold by different manufacturers, or even the same products sold through different techniques, would sometimes fall under the Act sometimes would not.

In order to provide a level playing field for all companies and all industries that will be participating in the new open telecommunication ball game, and to avoid confusion, it is recommended that a definition something like the following be used for CPE:

CPE, as it applies to the disability access provisions of the Telecommunications Act and the subsequent regulations, would be taken to include: "Any hardware or software which defines part of the interface experienced by a user when operating equipment employed on the premises of a person (other than a carrier) to originate, route, or terminate telecommunications.

- This definition would include the hardware the individual had in their hands.
- It would include the software which controlled how the hardware behaved (regardless of whether it was frozen in the hardware via ROM, loaded into the hardware by the hardware manufacturer, loaded into the hardware by the systems integrator, or loaded into the hardware by the telecommunications service provider).
- It would cover a user interface which is determined by software running on a remote platform which creates a virtual user interface which is displayed to the user on their CPE.

This definition would be consistent with Microsoft's concern that software which does not affect the user interface would not be covered.

It is also consistent with a comment that software which might be running on the same hardware but which does not deal with telecommunication or enhanced telecommunication functions should not be covered.

This is not consistent with a feeling that all software should be exempted (suggested by Microsoft. It is also not consistent with a hardware-only approach to accessibility.

It does account for the fact that telecommunication and enhanced telecommunication service providers are now and will increasingly be providing both hardware and software components of the customer premise equipment free of charge as a part of their service.

It also accounts for thin client and very thin client technologies which are rapidly emerging and being endorsed by major telecommunication players from all industries, by recognizing that the human interface on the CPE may be the result of software which is either downloaded from or runs on equipment which is not located on the customer's premises.

The rationale for this approach, which was discussed in the original comments that I submitted but is elaborated here in the context of the industry comments, is as follows.

Software determines the user interface more than hardware: In today's computers and most telecommunication and enhanced telecommunication devices, the user interface is almost entirely defined by the software rather than the hardware. Although the hardware provides some limits on what the software can do, the bulk of the user interface is determined by the software. Work with Apple Computer, IBM, Microsoft, and others in computer operating system has shown how much disability access can be achieved without making any hardware changes. Software can be used to make mouse functions operable from the keyboard for those who cannot operate a mouse. Software can allow screen displays to be made accessible to individuals with low vision or blindness, and information emitted by speakers to be displayed visually for individuals who are blind – all without any changes in the hardware. In fact, the accessibility of almost any product can be tremendously enhanced by modifying nothing more than the instructions (the software) which govern its behavior. On the other hand, relatively little can be done to make a product more cross-disability accessibility without addressing the software issue.

Telecommunication products of pure software: In addition, many telecommunication products are now being released which are pure software, and involve no hardware. For example, Netphone and several other products are available which will turn an ordinary multimedia computer into a telephone which can be used to make phone calls over the Internet. Microsoft, Netscape, and many others are also building audio chat functions directly into their enhanced telecommunication products. As of September 1996, there were an estimated one million people using computers to carry out telephone conversations for free over the Internet. As mentioned above, many of these people are using products which consist of nothing but software which they used with their standard home (or business) computer. (See attached news items.)

Service providers are giving away free CPE: It has been a common practice for telecommunication providers, including cellular phone providers, to provide free customer premise equipment when someone signs up and uses their telecommunication services. In some cases, the service providers are basically carriers. In other cases, the equipment is being provided free in conjunction with enhanced telecommunication services. It seems clear that the customer premise equipment is customer premise equipment whether it is purchased by the user separately or provided free of charge as a part of a telecommunication or enhanced telecommunication service.

Service providers are providing all or some of the software component of the CPE: As discussed above, the software which drives the CPE is an integral part of the CPE, and in fact defines most of its human interface. If a manufacturer provides the hardware and software, it is clear that they have provided the individual with the CPE, and that the CPE should be accessible. A manufacturer who upgrades the individual's CPE in order to allow the user to work with their service should similarly have their upgrade counted as part of the CPE, whether that upgrade is hardware-based or software-based. The user interface on the CPE that is a function of the service provider's upgrade to the CPE should be covered under the regulations, and should be accessible if readily achievable.

If this is not so, then individuals providing original equipment would be at a disadvantage as compared to those companies who would upgrade the equipment, since the former would be required to examine disability access features (where readily achievable) but the latter would not.

Again, responsibility to maintain an accessible interface should apply whether the upgrade were hardware and software based or only software based.

Virtual user interfaces should also be covered. As the bandwidth increases, it is possible (and planned) that increasing amounts of the software that would normally run on the user's CPE would instead run on a remote service provider's hardware, with an image of the user interface transmitted down to the CPE. In this case, the "buttons" on the touchscreen on the individual's "cyberphone" would not be generated by software in the "cyberphone," but rather by the service provider. When the individual touched the screen where they saw a button, the location where they touched the screen would be sent to the service provider. The service provider would then register the fact that the button had been pressed. As far as the user was concerned, they would have no way of knowing that the software that is creating the human interface they were looking at was running on a remote server rather than running in the particular piece of hardware they were holding in their hand. The user interface would appear on the CPE and be used by the customer.

While such a simple interface as this would typically be implemented in this fashion, many of the interfaces that are being proposed, which would achieve the exact same function (such as voice dialing, etc.), would be. This approach allows for much more sophisticated computing power to be used; it allows the device that the individual holds to be much smaller and lighter, less expensive, and to last longer on a battery; and it makes the user more dependent on a particular service provider and less likely to change providers (which would also cause them to change and learn a new interface).

Again, if CPE is defined as only hardware and software which is running on the software which is held in the individual's hand, then some or all of the interfaces of even current telecommunication products would be exempt from the Act's rules and regulations. An uneven playing field would again result, where companies whose systems ran the interface software on the hardware would be covered by the guidelines and regulations, while other companies who implemented interfaces which might look and act exactly the

same way as far as the user concerned, but which were implemented using very thin client technologies where the software ran on a remote piece of equipment, would not be susceptible.

It would also mean that the smallest, lightest, thinnest, easiest to carry, and most powerful (and therefore easiest to implement such technologies as voice recognition, speech-to-text and other translation techniques) products would be the very products which would not fall within the scope or definition of the rules and regulations set forth by the FCC.

If a definition such as the one above were used, it is fairly simple to determine which technologies are or are not covered: "if the product or component (hardware or software) is intended for telecommunication or enhanced telecommunication and helps to define the user interface experienced by an individual using CPE," then it is covered.

It would also provide a level playing field across the many different industries, all of which are vying to compete in the telecommunication arena.

Conclusion

Breadth or narrowness of applicability of the law

Several companies expressed concern with the scope and spoke to limiting the applicability of the law. Convergence and modern trends, as well as across-industry openness that this act seeks to create make this impossible. Telecommunication and enhanced telecommunication will be integrated across devices and across technologies. It will pervade all aspects of our lives in much the same way electricity does today. It will be everywhere; built into our education, work, and daily living environments and even into the clothes we wear. Not all of these new implementations will be easy to make accessible across all disabilities, but where it is readily achievable and for those people for whom it is readily achievable it should be done. If it is not, then the education, work, and living environments or the telecommunication and extended telecommunication services within these environments will not be accessible and usable, and their participation in these environments will be curtailed or impossible. .

Rather than companies focusing on trying to limit their coverage under the law, industry should (as many of the companies suggested in their responses) work with the FCC, the Access Board, and consumers to develop better technologies and standards for making products accessible - both to this generation and the next - in ever more readily achievable fashions.

Congress has inserted the key phrase, "where readily achievable," which moderates all and sees that accessibility is applied or regarded only when it is possible and practical to do so. Innovation need not in any way be curtailed: in fact, it is encouraged if no ways to make a new technology accessible are known or readily developable, then progress moves forward anyway, without full accessibility. As ideas or strategies develop which are readily achievable - then they are incorporated. If they are only readily achievable in new products, then only new (or next generation) products would be required to

incorporate the idea. If it is readily achievable to implement on current products (e.g., rolling features into next regular software upgrade) then that would happen.

A key provision and purpose of the Telecommunication Act was to open up competition and level the playing field across industries. It is very important that functional (e.g., “relating to telecommunication”) rather than categorical (e.g., hardware, software) or jurisdictional (CPE manufacturer, carrier, service provider) [concepts] be used in developing regulations.

It is already difficult to figure out "who" is functioning in which "role" in any point in time and this will get only more difficult as lines blur, both due to actions taken in the Telecommunication Act of 1996 and due to the evolution of the technologies.

Enforcement yields a level playing field

For the Act to be effective in maintaining a level playing field, it will also be important that the FCC develop a regulation and implementation plan that helps ensure that the field stays level - that the companies who are making genuine efforts to incorporate readily achievable access measures do not ever feel that they are at a disadvantage because other companies do not feel any real pressure or compunction to comply with the law.

Horror stories

There will always be horror stories in any area of legislation and regulation. It is interesting, though, that the story brought forward by one of the respondents referred to the company that closed down because they were concerned with complying with ADA regulations. In reading the comments further, it turns out that the business never bothered to check what the regulations were and were in compliance. This does not seem to be an indictment of the regulations, but rather what can happen when fear and overly quick reactions replace careful consideration of both the regulations and the reasonableness clauses that Congress and government agencies have carefully put into the law and regulations.

With one-fifth of the population having some type of functional impairment -- and a much higher percentage of people who are older having functional impairments -- and with a growing percent of the population who find themselves in the “older” age bracket, it is important that new product development include accessibility wherever readily achievable. It is important that these individuals (actually all of us) be able to figure out and physically use the products that will be designed and forced upon us as we age by people who, for the most part, are younger and without disabilities - and who do not (yet) personally have any difficulty using the products they are designing.

Ease of implementation

Finally, what seems to be missed in many of the comments is the ease with which many, even most, of the accessibility accommodations can be implemented with products once companies learn how and incorporate it in their standard design process – and the benefit in ease of use and flexibility that will accrue to all users [NYNEX, Pacific Telesis].

Thank you for the opportunity to comment on this matter.

Respectfully submitted,
Gregg C. Vanderheiden, Ph.D.
Director, Trace R&D Center

Attachment A

Below are items taken from Edupage, an on-line newsletter put out by Educom. They are clips taken from newspapers around the country. These clips exemplify the rapid blurring of lines between standard telephony industries and products and computer and information industries and products. This is what is happening today. In the future, it will be even more blurred, with software playing the predominant role in defining telecommunication products and how they behave.

WEB SURFING ON THE GO

AT&T's Wireless Services unit will offer a portable PocketNet Phone that provides Web access, fax and e-mail capabilities. It contains a custom-developed browser for viewing Web pages, and will be priced around \$600 when it hits the shelves later this year. (Investor's Business Daily 7 Oct 96 A8)

WEB SURFING BY PHONE

NetPhonic Communications' Web-On-Call Voice Browser allows users to phone into Web pages rather than use a PC. The system uses voice-recognition technology to dial into a Web site named by the user, and then reads back the text of the Web page. The product is marketed toward people on the go who don't have time to sit at their PCs and surf the Web, but could also be useful for the visually impaired. One drawback -- the NetPhonic software requires a high-end Sun Microsystems workstation to function. (Investor's Business Daily 12 Sep 96 A8)

VOICE ON NET

Although the quality of voice communication over the Net is still far from perfect, Internet telephony is gaining in popularity and causing the long-distance phone companies enough concern that they've petitioned the Federal Communications Commission to regulate the providers of Internet voice-communications software as if they were telephone companies. Jeff Pulver of the Voice On Net Coalition, a group formed to coordinate the promotion of Internet telephony, says that "this stuff really works. No doubt there are going to be tremendous applications in business." The Coalition's site is < <http://www.von.org> . (New York Times 19 May 96 p8)

VENDORS LINE UP BEHIND JAVATEL

Six hardware and software companies have signaled their support for Sun Microsystems' Java Technology Toolkit, or JavaTel, a cross-platform product designed to link any telephone, appliance or networked computer to any Java-based application. IBM, Intel, Lucent Technologies, Nortel and Novell have said they'll support the standard, and more companies are reportedly ready to join the pack, according to Sun's director of market strategies and technologies. JavaTel will offer software developers and device manufacturers a uniform interface for

driving basic telephony functions, such as call setup, disconnect, hold and call transfer. A series of JavaTel Extension Packages will deliver interfaces such as advanced call control, media services, terminal management, call center management and mobile services. (Interactive Age Digital 4 Oct 96)

UTILITIES TO OFFER FULL TELECOM SERVICE

Electrical utility Boston Edison Co. and cable- and telecom-operator C-Tec Corp. are building a \$300-million data network to offer customers a smorgasbord of cable television, Internet access, and local and long-distance phone services. The network will capitalize on Boston Edison's already-installed base of 200 miles of fiber-optic lines, which is currently used for communications between its power plant and transmission stations. Customers eventually will be able to use the network to order electricity, home security, and monitoring for heating and cooling systems. (Investor's Business Daily 1 Oct 96 A9)

U. OF ARIZONA FORMS ALLIANCE WITH LUCENT TECHNOLOGIES

The University of Arizona and Lucent Technologies have formed the UA/Lucent Technologies Alliance for Learning. The Alliance will collaborate on creating a "virtual classroom" and designing instructional software tools and collaborative environments based on users' personal learning styles, interest and real-world needs. In addition, the Alliance plans to develop a user-friendly multimedia administrative system and integrate UA's telephone, data and video equipment and services into a multimedia network connecting buildings, homes and businesses. (The Heller Report Sep 96)

THE SOUNDS OF THE WEB

Mountain View, Calif.-based NetPhonic Communications Inc.'s Web-On-Call Voice Browser offers text-to-voice capability that lets Web surfers listen to Web pages over an ordinary telephone. The \$1,000 program installs on a company's Web server and "reads" standard .html formatted pages over the phone to customers who don't have access to PCs. (Investor's Business Daily 11 Mar 96 A6)

TAKING YOUR PERSONAL ASSISTANT ON THE ROAD

McCaw Cellular subscribers soon will be able to dial into one number and tell a computer in natural language to place phone calls, answer voice-mail and keep track of reminders, using "electronic personal assistant" technology produced by Wildfire Communications Inc. "This is breakthrough stuff. It's as far beyond voice mail as the telephone is beyond the telegraph," says the president of a telecommunications consulting firm. Future versions will integrate e-mail, fax, paging, and personal digital assistant technologies. (Information Week 2/6/95 p.16)

SPEEDY HOTWIRE MODEMS

The new HotWire system from Paradyne Corp. use an RADSL (rate adaptive

digital subscriber line) modem that can send data at speeds up to 2 million bits per second, making it possible to send video over ordinary telephone lines. The technology is more than 15 times faster than conventional ISDN (integrated services digital network) lines. (Tampa Tribune 21 Sep 96 B&F1)

SMART PHONE

Colonial Data Technologies' Telesmart 4000 phone incorporates the ability to send e-mail over the Internet, pay bills and bank electronically, type and send text messages directly to pagers, shop from electronic catalogs, and manage calls via a full range of Caller ID services. The device includes a graphic display screen, magnetic card reader, alphanumeric keypad, v.22 modem and processor, and is priced at \$289.99. (Newspage Business Wire 8 Jan 96)

PETITION FILED ON NET TELEPHONY

The Voice on the Net coalition has filed comments with the FCC, protesting that recent attempts by the America's Carriers Telecommunications Association to persuade lawmakers to regulate Internet telephony "are designed to protect the economic self-interest of a narrow group of companies at the cost of a variety of beneficial new services." International Data Corp. predicts that the customer base for Net-based telephony will increase to 16 million users by the end of 1999, generating an estimated \$560 million. Internet telephony brought in about \$3.5 million in revenues last year. (Information Week 17 Jun 96 p33)

PACTEL OFFERS INTERNET ACCESS

San Francisco-based regional phone company Pacific Telesis will offers its customers Internet access at a range of prices topped at \$19.95 a month for unlimited usage. The company has engineered its network to deal with a high volume of Internet traffic and has established 24-hour customer service assistance staffed by Internet specialists. (Wall Street Journal 28 May 96 A3)

ORACLE CEO PREDICTS PHONE COMPANIES WILL OFFER NCs

Oracle Chief Executive Larry Ellison is predicting that some phone companies will begin consumer trials of Internet appliances sometime during the next six months, with the appliance being distributed to phone customers along with communications services for one monthly fee. But Ellison warns that to make the venture a success, phone companies will have to make surfing the Web as simple as using a telephone. (Wall Street Journal 10 Sep 96 A7)

NYNEX ANTICIPATES UP IN INTERNET ACCESS GAME

Nynex will join AT&T, MCI in offering Internet access to residents and businesses. "It's going to end up becoming a normal part of a package that all telephone companies have to offer," says an analyst at CS First Boston. Meanwhile, Bell Atlantic is putting the finishing touches on its Internet access plan, and several other Baby Bell brethren plan announcements soon. (Investor's Business Daily 20 Mar 96 A7)

NORTHERN TELECOM PHONES GET JAVATIZED

Northern Telecom plans to incorporate Sun Microsystems' Java microprocessors and software in a new class of inexpensive "smart" telephones designed to double as Internet appliances. The move makes Northern Telecom the first telephone manufacturer to license Java chips for its products. The chips will be used in its wired PowerTouch phones and its wireless digital phones, and customer trials should start next year. (Wall Street Journal 23 May 96 B3)

NEW WIRELESS PRODUCTS Among the wireless products coming soon will be ones that make it possible to use your credit card to pay a traveling salesperson or a sidewalk vendor. Some other products: Panasonic has a Personal Handyphone system that allows two workers in the same building to talk with each other over special headsets while simultaneously using wireless laptop computers; Motorola has a service that automatically tracks a roving user at home, at work, or while commuting; Toshiba's wireless navigational system sends signals to three circling satellites that pinpoint the location of a vehicle and report its progress on a street map displayed on the automobile's color monitor. (Wall Street Journal 2/3/95 B1)

NEW SYSTEM FOR LINKING PCs TO PHONES

Dialogic Corp. and Israeli firm VocalTec Inc. have developed a technology that allows voice conversations via the Internet between PCs and ordinary telephones. The Internet Phone Telephony Gateway allows computers to place phone calls anywhere in the world via the public switched phone network. The price of the system, which will be available in the second quarter of this year, has not yet been set. (Investor's Business Daily 11 Mar 96 A7)

NEW MOVES AT AT&T

AT&T's Internet Toll-Free Directory now allows users to "hot-link" to the Web sites of AT&T's 800-line customers. So if a customer uses the online service to locate L.L. Bean's toll-free 800 number, he or she can either call the number or link to L.L. Bean's Web site to place their order there. <
<http://www.tollfree.att.net/> (Investor's Business Daily 10 Apr 96 A8) Meanwhile, AT&T WorldNet will license Lycos Inc.'s Internet search tools, including the Lycos catalogue and the a2z directory. "AT&T's new service is designed to help people find their way into cyberspace, and it has chosen the Lycos products to hop guide customers toward the specific information they're looking for," says Lycos's CEO. (Investor's Business Daily 10 Apr 96 A9) And AT&T's Bell Labs has developed Watson ASAP, a speech-processing system that recognizes up to 100 customized commands and can read e-mail messages over the phone. The system, named after Alexander Graham Bell's assistant Thomas Watson, understands words spoken at conversational speed and can be adapted so that other electronic gadgets, such as VCRs, will respond to voice commands. (Wall Street Journal 10 Apr 96 B6)

NEW GROUPWARE PRODUCTS FROM NETWORK

In addition to announcing the new 4.0 version of its Navigator browser software, Netscape is introducing new group aimed at the corporate market and featuring enhanced e-mail, group scheduling, filing sharing, and audio software. The audio software will support two-way phone calls over the Internet. (Wall Street Journal 15 Oct 96 B7)

NETSCAPE UNVEILS NAVIGATOR 3.0

Trying to stay one step ahead of Microsoft, Netscape announced a new version of its Navigator Web browser, just three months after the last one. Navigator 3.0 includes features such as software for making phone calls over the Internet, a "shared whiteboard," enabling users in different locations to collaborate on a document, and 3D graphics. The new browser will also link to the VeriSign service to provide security for electronic commerce. (Wall Street Journal 29 Apr 96 B7)

NETSCAPE TO GET IN ON THE PHONE-BY-INTERNET ACTION

Netscape co-founder Mark Andreessen says that within six months the company will build into its Navigator program voice software (which it calls Insoft) for making low-cost long distance calls via the Internet into its Navigator program and that long-distance phone companies increasingly won't be able to justify their rates for telephone service. (Sydney Morning Herald 13 Mar 96 via Individual Inc.)

MICROSOFT, MCI, DIGITAL TARGET CORPORATE INTRANETS

Microsoft, MCI Communications and Digital Equipment Corp. have formed an alliance to offer businesses an integrated package of communications services and products, including high-speed Internet access, e-mail and groupware. The new agreement pits Microsoft, MCI and Digital directly against AT&T, IBM and Netscape, which have teamed up to offer similar Intranet services. "This stuff is hotter than hot," says an analyst at Forrester Research. "Over half of the Fortune 1000 companies will be up and running with Intranets by the end of the year." "These phone companies are rapidly expanding into areas that are way outside of their core areas. Anything and everything that address businesses' communications needs is in play," says an Atlanta-based telecommunications consultant. (Wall Street Journal 8 Apr 96 B6)

MICROSOFT WANTS TO SURROUND YOU AND START YOU UP

Further blurring the lines between TV and PC capabilities, Microsoft is planning to integrate Dolby Laboratories' six-speaker Surround Sound technology into personal computer software. (Atlanta Journal-Constitution 2 Apr 96 F3) ... Microsoft also says it will use the OnNow standard to allow PCs to turn on instantly and be immediately (like toasters and other consumer appliances); Microsoft executive Jim Allchin says: "Users are demanding that PCs become more convenient to access and use. They want their PC to be instantly available

to answer the phone, display new e-mail, browse the Internet or run an application." (Financial Times 2 Apr 96 p19)

LUCENT'S NET SOFTWARE MAKES INTERNET PHONE CALLS EASY

New software developed by Lucent Technologies is designed to give Internet callers quicker access to one another and allows them to converse via their computers as if they were on a regular speaker-phone. Previous software has been half-duplex -- one party must stop speaking before the other can "capture" the line. Lucent plans to market the software to AT&T, the Bell companies and Internet service providers for distribution to their customers. By the end of the year, Lucent plans to enhance the software so that users can videoconference over the Internet. (Wall Street Journal 18 Sep 96 B8)

LONG-DISTANCE CALLING TAKES OFF ON INTERNET

Companies ranging from small startup firms to the big chip maker Intel Corp. have been intent on getting surfers hooked on Internet chatting. For consumers it has one big drawing card: it is a lot cheaper than paying long-distance tolls. Some have predicted there are already more than a million people using the Internet to make telephone calls. Jeff Pulver, of Voice Over Network (VON), however, says his best estimate has 55,000 people a week phoning over the Net, up from 30,000 two months ago. (Toronto Star 25 Sep 96 C11)

JUDGE TO PHONE COMPANIES: LET THE COMPETITION BEGIN!

Federal District Court Judge Harold H. Greene, who oversees the seven Bell regional operating companies, has ruled that Bell Atlantic can compete directly with cable operators and TV broadcasters in transmitting video programming anywhere in the country. It is expected that the ruling will soon be extended to the other Bells. Judge Greene, who presided over the 1984 breakup of AT&T that precluded the Bells from competing in the long-distance phone market, said this week that the prohibition did not apply to TV programming. (New York Times 3/18/95 p.1)

INTERNET SHOPPING APPLIANCE

TransPhone, a U.S.- and Canadian-based start-up company, has come up with a low-cost interactive appliance, which combines the functions of a full Web browser, two-line phone, fax machine and answering machine into one unit. The company also plans to offer an interactive TV version that can plug into a TV equipped with a cable modem. "One of the targets is the (large) percentage of people who do not have computers," says TransPhone's president. The appliance will be available in June and subscriptions will run about \$20 a month. (Broadcasting & Cable 15 Apr 96 p81)

INTERNET PROVIDER TAKES ON PHONE COMPANY

Canada's largest Internet service provider iStar is challenging the phone companies head-on by offering private networks to businesses communicating on

the Internet. Secure*net, known in the industry as a virtual private network allows companies to transmit data to remote offices over lines dedicated to one client for a fraction of the cost many companies pay for leasing transmission lines from phone companies. (Ottawa Citizen 11 Jan 96 C6)

INTERNET LONG-DISTANCE TO FIGHT PHONE FEES

New Internet long-distance provider ShadowTel vowed to fight a Canadian regulatory commission decision that it must pay contribution fees to phone companies to help keep local rates low. The company's position is that rules for long-distance resellers should not apply to it because it uses Internet technology from beginning to end. (Ottawa Citizen 27 Apr 96 E4)

INTERNET IS "FUNDAMENTAL CHANGE" IN TELECOM

Netscape president Jim Clark says: "I've been talking to the telecommunications companies and telling them that it's the future. It represents the first fundamental change since the telecommunications system was invented. The biggest change up to now was when the telephone moved from a rotary dial to Touch-Tone ... that's really a small change compared to this." (Atlanta Journal-Constitution 4 Jun 96 F3)

INTERACTIVE TV GAMES FROM GTE AND NINTENDO

The Nintendo/GTE alliance to develop interactive video games has produced its first product, a game called FX Fighter that will be used at first on Nintendo 16-bit or soon-to-come 64-bit players, but is destined also to run over GTE phone lines carrying interactive TV and other services. (Wall Street Journal 1/4/95 B7)

INTEL, MICROSOFT CROSS-LICENSE AGREEMENT

Intel Corp. and Microsoft Corp. have agreed to cross-license their Internet communications technology in an effort to pursue Internet-based telephone and videoconferencing business opportunities. The alliance, which will exploit Intel's Proshare videoconferencing technology and Microsoft's NetMeeting and ActiveX software, will also develop technology to allow users to find other people to talk with on the Internet via a User Location Service. (Investor's Business Daily 18 Jul 96 A9)

INTEL VIDEO-PHONE TECHNOLOGY FOR HOME PC

Intel says that hundreds of thousands of personal computers with video-phone capabilities will be sold this year and millions more soon thereafter. Using Pentium chips and compression software, the systems could transmit and receive video and audio information simultaneously over standard phone lines, with images at 4 to 12 frames a second. (New York Times 30 May 96 C2)

INTEL DEBUTS NET PHONE SOFTWARE

Intel Corp. is now marketing Internet phone software developed by Microsoft, which, unlike competing products from VocalTec and Camelot, can be used over a broad array of software. VocalTec customers must buy two pieces of software

in order to talk to each other over the Internet. "Intel is seeding the market. They're going to get people to do more things with their PCs so they can sell more Pentium processors," says a Forrester Research analyst. The new program will be available on the Internet < <http://www.intel.com/iaweb/cpc> . (St. Petersburg Times 23 Jul 96 E1)

GLOBESPAN SPEEDS UP THE INFOBAHN

A new type of modem that incorporates AT&T Paradyne's GlobeSpan technology will soon make it possible to access the Internet at speeds 200 times faster than a conventional 28.8 modem. GlobeSpan Rate Adaptive Digital Subscriber Line technology can accommodate video phone calls, simultaneous calls by different family members, or movies, all over existing twisted pair phone lines. AT&T expects to have RADSL fully developed by November, and manufacturers should be ready to sell the gadgetry to telephone companies sometime in 1997. And though the phone companies are touting the benefits of ISDN now, the simplicity of RADSL technology has distinct advantages -- it doesn't require a separate phone line, nor does it burden telephone company switching equipment. (Tampa Tribune 4 Jun 96 B&F1)

CELL PHONES DO THE INTERNET

Motorola has a new service that can check your e-mail and convert it into a voice message you can hear over the phone. The service will also be able to send and receive faxes, and by next year should be able to turn a voice message into e-mail and send it for you. It's expected to cost about \$20 a month for receiving e-mail and other messages, and 50 cents a minute to send messages. Meanwhile, Finland's Nokia has a "smart phone" whose handset flips open to reveal a small keyboard and screen that does much the same thing as Motorola's service. Nokia's model, based on GSM technology, won't be available in the U.S., where the technology has been blamed for interfering with hearing aids. (Wall Street Journal 25 Mar 96 B10)

CALLING FROM THE WEB

New software from VocalTec allows users to initiate a voice conversation while perusing a Web site. For instance, a person scanning a clothing retailer's Web site could click on a "phone call" icon, and connect directly to someone at the company via the Internet. The feature is included in VocalTec's Internet Phone Telephony Gateway Server. PC owners must have extra software for their Web browsers to make the voice link work. A free version is available for testing at < <http://www.vocaltec.com> . (Tampa Tribune 12 Aug 96 B&F5)

CALLING FROM THE WEB

NetSpeak Corp., which makes WebPhone Internet telephone software, is working with Rockwell International Corp. to develop Internet-based call centers on the Web. The technology will allow electronic shoppers to browse a Web site and

place voice calls to the company by clicking on an icon. (Investor's Business Daily 22 Aug 96 A6)

AT&T LIKES INTERNET PHONE IDEA

While small companies are banding together to combat voice transmissions via the Internet, telephone giant AT&T kind of likes the idea. "Obviously, we're in the telephone business, but we're also in the Internet business," says an AT&T spokesman. "We view telephone services on the Internet as a potentially large business, and we're looking into it." (Investor's Business Daily 8 Apr 96 A8)

"SMART PHONE" COMPANIES MERGE TO FORM TRITECH CORP.

U.S. Order Inc. and Colonial Data Technologies Corporation are merging to form Trittech Corporation, which will pursue a strategy of providing a "complete system," including phones, networks and services. Trittech's chief executive officer says: "There are a lot of people saying, 'Here is a screen phone, go do something with it. But a market doesn't just need hardware, it needs end-to-end solutions.'" (New York Times 6 Aug 96 C2)